

**Claim Listing**

1. (Previously presented) A computer implemented method for designing and constructing a model based information system architecture, the information system architecture being the architecture of an information system which includes a number of interconnected hardware and software components implementing one or more business solutions, comprising the steps of:
  - (a) providing a business process design, the business process design describing a plurality of business processes and defining a set of business requirements for each business process;
  - (b) using a multi-layer mathematical model of a proposed information system architecture supporting the business process design, constructing the proposed information system architecture, the multi-layer mathematical model being implemented on a computer and the layers of the multi-layer model comprising a business layer, an application layer, and a technology layer, the business layer, application layer and technology layer having different data than each other, said constructing comprising mapping each business process to an application component which is modeled by a corresponding application component model in the application layer, each application component model linked to one or more component models in the application and technology layers, which support the corresponding application component,

wherein the constructed proposed information system architecture comprises a technology bus, the technology bus serving as an abstract interface for data access or technology services between the components modeled in the application and technology layers, and wherein the constructed proposed information system architecture further comprises an application bus, the application bus providing a communication, distribution, and management interface between application component models in the application layer;
  - (c) during the constructing, modeling performance metrics for each layer of the multi-layer model including continuous service of the proposed information system architecture;

(d) comparing the modeled performance metrics with the set of business requirements for each business process, said comparing producing respective indications of unacceptable performance metrics of one or more business processes that do not satisfy the set of business requirements defined for them based on the produced indications; and

(e) determining modifications to the proposed information system architecture as being constructed, resulting in an information system architecture design, a description of the resulting information system architecture design being output.

2. (Previously presented) The method of claim 1, further comprising:

using the determined modifications to modify the constructed proposed information system architecture and forming a modified proposed information system architecture;

modeling updated performance metrics for each layer of the model of the modified proposed information system architecture;

comparing the updated performance metrics with the set of business requirements for each business process; and

outputting a description of the modified proposed information system architecture if the updated performance metrics satisfy the set of business requirements.

3. (Previously presented) The method of claim 1, wherein determining modifications to the constructed proposed information system architecture, further comprises:

identifying component models in the application and technology layers that support the one or more business processes having unacceptable performance metrics;

evaluating the performance metrics of the supporting component models in order to identify one or more supporting component models having unacceptable performance metrics; and

searching a data store for modifications to improve the unacceptable performance metrics of the one or more supporting component models.

4. (Previously presented) The method of claim 3, wherein the modifications to improve the unacceptable performance metrics of the one or more supporting component models include replacement of the one or more supporting component models with alternate component models from the data store.
5. (Previously presented) The method of claim 3, further comprising:  
proposing that the business process design be modified, if none of the supporting component models in the application or technology layers have acceptable performance metrics.
- 6-8. (Cancelled)
9. (Previously presented) The method of claim 1, wherein the constructed proposed information system architecture has a business application layer and an application engines layer, the application components are subdivided into the business applications layer and the application engines layer, the business applications layer comprising application components providing real-time or right-time processing, the application engines layer comprising application components that provide deferrable processing and support one or more application components in the business applications layer.
10. (Previously presented) The method of claim 1, wherein any combination of component models supporting a business process may be substituted to improve unacceptable performance metrics of the business process.
11. (Previously presented) A computer system for designing and constructing a computer model based information system architecture, information system including a number of interconnected hardware and software components implementing one or more business solutions, comprising:  
a digital processor executing:

(a) a business process design module providing a business process design, the business process design describing a plurality of business processes and defining a set of business requirements for each business process;

(b) an architecture construction module responsive to the business process design, using a multi-layer mathematical model, the architecture construction module constructing a proposed information system architecture supporting the business process design, the multi-layer mathematical model being implemented on a computer and the layers of the multi-layer model comprising a business layer, an application layer, and a technology layer, the business layer, application layer and technology layer having different data than each other;

the architecture construction module mapping each business process to an application component which is modeled by a corresponding application component model in the application layer, each application component model being linked to one or more component models in the application and technology layers, which support the application component model;

wherein the constructed proposed information system architecture comprises a technology bus, the technology bus providing an abstract interface for data access or technology services between the components modeled in the application and technology layers; and

the constructed proposed information system architecture further comprises an application bus, the application bus providing a communication, distribution, and management interface between application component models in the application layer;

(c) a performance modeling module coupled to the architecture construction module, during the architecture construction module constructing the proposed information system architecture, the performance modeling module modeling performance metrics for each layer of the multi-layer model including continuous service of the proposed system architecture;

(d) a comparison module coupled to receive the modeled performance metrics and the business process design, the comparison module comparing the modeled performance metrics with the set of business requirements for each business process and determining

any unacceptable performance metrics of one or more business processes that do not satisfy the set of business requirements defined for them;

(e) a rule-based modification engine responsive to the comparison module, the rule-based modification engine determining modifications to the proposed information system architecture as being constructed in order to improve the unacceptable performance metrics determined by the comparison module; and

(f) an output module coupled between the rule-based modification engine and the architecture construction module, the output module proposing the determined modifications to the proposed information system architecture under construction.

12. (Previously presented) The system of claim 11, wherein:

the performance modeling module further models updated performance metrics for each layer of the model of the constructed proposed information system architecture with the determined modifications;

the comparison module further compares the updated performance metrics with the set of business requirements for each business process; and

the output module further outputs a description of the proposed information system architecture as modified by the determined modifications if the updated performance metrics satisfy the set of business requirements.

13. (Original) The system of claim 11, wherein:

the architecture construction module further identifies supporting component models in the application and technology layers that support the one or more business processes having unacceptable performance metrics;

the comparison module further evaluates the performance metrics of the supporting component models in order to identify one or more supporting component models having unacceptable performance metrics; and

the rule-based engine further searches a data store for modifications to improve the unacceptable performance metrics of the one or more supporting component models.

14. (Original) The system of claim 13, wherein the modifications to improve the unacceptable performance metrics of the one or more supporting component models include replacement of the one or more supporting component models with alternate component models.
15. (Previously Presented) The system of claim 13, wherein:  
the output module further proposes that the business process design be modified, if none of the supporting component models in the application or technology layers have acceptable performance metrics.
- 16-18. (Cancelled)
19. (Previously presented) The system of claim 11, wherein the constructed proposed information system architecture has a business application layer and an application engines layer, the application components are subdivided into the business applications layer and the application engines layer, the business applications layer comprising application components providing real-time or right-time processing, the application engines layer comprising application components that provide deferrable processing and support one or more application components in the business applications layer.
20. (Previously presented) The system of claim 11, wherein any combination of component models supporting a business process may be substituted to improve unacceptable performance metrics of the business process.
21. (Previously presented) A computer system for designing and constructing a model based information system architecture, the information system architecture being the architecture of an information system which includes a number of interconnected hardware and software components implementing one or more business solutions, comprising:

means for receiving a business process design, the business process design describing a plurality of business processes and defining a set of business requirements for each business process;

means for constructing a proposed information system architecture supporting the business process design, said constructing means using a multi-layer mathematical model of the proposed information system architecture, the multi-layer mathematical model being implemented on a computer and the layers of the multi-layer model comprising a business layer, an application layer, and a technology layer, the business layer, application layer and technology layer having different data than each other, the constructing means mapping each business process to an application component which is modeled by a corresponding application component model in the application layer, each application component model linked to one or more component models in the application and technology layers, which support the corresponding application component,

wherein the constructed proposed information system architecture comprises a technology bus, the technology bus serving as an abstract interface for data access or technology services between the components modeled in the application and technology layers, and wherein the constructed proposed information system architecture further comprises an application bus, the application bus providing a communication, distribution, and management interface between application component models in the application layer;

means for modeling performance metrics for each layer of the multi-layer model including continuous service of the information system architecture during constructing means constructing the proposed information system architecture;

means for comparing the modeled performance metrics with the set of business requirements for each business process;

means for determining modifications to the proposed system architecture as being constructed in order to improve unacceptable performance metrics of one or more business processes that do not satisfy the set of business requirements defined for them;  
and

means for proposing the modifications to the proposed information system architecture under construction, resulting in an information system architecture design, a description of the resulting information system architecture design being output.

22. (Previously presented) An information system architecture that is generated by the computer implemented method for designing and constructing a model based information system architecture, the information system architecture being the architecture of an information system which includes a number of interconnected hardware and software components implementing one or more business solutions, comprising the steps of:

providing a business process design, the business process design describing a plurality of business processes and defining a set of business requirements for each business process;

using a multi-layer mathematical model, constructing a proposed information system architecture supporting the business process design, the multi-layer mathematical model being implemented on a computer and the layers of the multi-layer model comprising a business layer, an application layer, and a technology layer, the business layer, application layer and technology layer having different data than each other, said constructing including mapping each business process to an application component which is modeled by a corresponding application component model in the applications layer, each application component model linked to one or more component models in the application and technology layers, which support the corresponding application component,

wherein the constructed proposed information system architecture comprises a technology bus, the technology bus serving as an abstract interface for data access or technology services between the components modeled in the application and technology layers, and wherein the constructed proposed information system architecture further comprises an application bus, the application bus providing a communication, distribution, and management interface between application component models in the application layer;



during the constructing, modeling performance metrics for each layer of the multi-layer model including continuous service of the information system architecture;

comparing the modeled performance metrics with the set of business requirements for each business process, said comparing producing respective indications of unacceptable performance metrics of one or more business processes that do not satisfy the set of business requirements defined for them based on the produced indications; and

determining and incorporating modifications to the proposed information system architecture as being constructed, resulting in an information system architecture design, a description of the resulting information system architecture design being output.

23. (Previously presented) An article of manufacture, comprising:

a computer-readable memory device;

a set of computer operating instructions embodied on the memory device, including instructions for designing and constructing a model based system architecture, comprising instructions for:

providing a business process design, the business process design describing a plurality of business processes and defining a set of business requirements for each business process;

constructing a proposed information system architecture supporting the business process design using a multi-layer mathematical model, the layers of the multi-layer model comprising a business layer, an application layer, and a technology layer, the business layer, application layer and technology layer having different data than each other, said constructing including mapping each business process to an application component which is modeled by a corresponding application component model in the application layer, each application component model linked to one or more component models in the application and technology layers, which support the corresponding application component,

wherein the constructed proposed information system architecture comprises a technology bus, the technology bus serving as an abstract interface for data access or technology services between the components modeled in the application and technology

layers, and wherein the constructed proposed information system architecture further comprises an application bus, the application bus providing a communication, distribution, and management interface between application component models in the application layer;

    during the constructing, modeling performance metrics for each layer of the multi-layer model including continuous service;

    comparing the modeled performance metrics with the set of business requirements for each business process, said comparing producing respective indications of unacceptable performance metrics of one or more business processes that do not satisfy the set of business requirements defined for them based on the produced indications; and

    determining modifications to the proposed information system architecture as being constructed, resulting in an information system architecture design, a description of the resulting information system architecture design being output.

24. (Cancelled)